

Description of *Rhabdontolaimus psacothaeae* n. sp.
(Diplogasterida: Diplogasteroididae), isolated from the yellow-spotted
longicorn beetle, *Psacothaea hilaris* (Coleoptera: Cerambycidae)
and fig trees, *Ficus carica*

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Rhabdontolaimus psacothaeae n. sp. (Diplogasterida: Diplogasteroididae) is described and figured. This new species was found from *Psacothaea hilaris* (Coleoptera: Cerambycidae) and fig tree, and this is characterized by the roundish triangular gubernaculum, conoid tail of male, and elongate and pointed tail of female. The new species is closely related to *R. carinthiacus* and *R. haslacheri* in the arrangement of caudal papillae of males, but easily distinguished from these two species by the shape of gubernaculum and some morphometric values. Jpn. J. Nematol. 32 (1), 7-12 (2002).

Key words: Japan, morphology, nematode, taxonomy.

A species of the order Diplogasterida was isolated from the yellow-spotted longicorn beetle, *Psacothaea hilaris* Pascoe, and fig tree, *Ficus carica* L., from which the beetles emerged. This species seemed to belong to the genus *Rhabdontolaimus* (Fuchs, 1931) Filipjev and Schuurmans Stelhoven, 1941, based on its morphological characters. The morphological characters of the genus are described as follows; Body 0.6 to 2 mm length. Six flat lips with fine bristlelike papillae. Stoma silindrical, straight, about three times longer than wide. Rhabdions heavily sclerotized. Cheilorhabdions buttonlike. Promesorhabdions ventral one is longer than dosal one. Dosal metarhabdions with three or more fine bristlelike tooth. Corps of esophagus muscular with a median bulb, basal bulb plus isthms are usually shorter than corpus plus median bulb. Vulva median, ovaries paired and opposed. Female tail conoid to sharply rounded or filiform terminus. Spicules paired, ventrally arcuate. Gubernaculum present. Male tail ventrally arcuate to a spicate or filiform terminus with five to ten pairs of caudal papillae with or without rudimentary leptoderan bursa (Andrassy, 1984; Massey, 1974). There are five species known to belong to the genus *Rhabdontolaimus*, which were summarized by Andrassy (1984), i. e. *R. adepagus* Massey 1974, *R. carinthiacus* (Fuchs, 1931) Filipjev and Schuurmans Stelhoven, 1941, *R. frontali* Massey, 1974, *R. haslacheri* (Fuchs, 1931) Paramonov and Turlygina, 1955, and *R. magnus* (Völk, 1950) Meyl, 1961. The newly found nematode is distinguished from all known species in some morphological characters, and described herein as *Rhabdontolaimus psacothaeae* n. sp.

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MATERIALS AND METHODS

Dispersal juveniles of the nematode were isolated from the reproductive tracts of male and female yellow-spotted longicorn beetles, *P. hiliaris*, emerged in August 1998 from *F. carica* planted in the campus of Kyoto University (Kyoto, Japan). A culture of the nematode was established on Asparagine-Mannitol agar. Adults were collected from a 3-week-old culture, heat-killed and fixed in TAF, processed into glycerol-ethanol series in Seinhorst's method and mounted in glycerin according to Maeseneer and d'Herde's method (Hooper, 1986).

Rhabdontolaimus psacothaeae n. sp.

(Fig. 1)

Measurements. See Table 1.

Description. *Male.* Body cylindrical, curve hooklike ventrally in tail when heat-killed. Cuticles fine transverse striations, and prominent longitudinal striations. Lip offset, roundish, with minute papillae. Cheilostom short, with distinct sheilorhabdion. Prorhabdion long, slender, slightly inclined dosally. Meso-, metarabhdions bearing teeth, 3 dosal, 2 subventral, only two visible in lateral view, dosal one rather long, arcuate, pointed, subventral one short, sharply pointed, thornlike. Corps of esophageus muscular, slender, with one-half body-diam. width, widening conspicuously at the median bulb. Corps and Median bulb longer than isthmus and basal bulb. Isthmus muscular, slender, with one-third body-diam. width, widening gradually at basal bulb. Nerve ring at midisthmus. Hemizonid just below the nerve ring. Excretory pore immediately posterior to hemizonid. Cardia well developed, darkened in colour. Testis single, reflexed, sperm in single or double rows. Spicules paired, ventrally arcuate, distal end sharply pointed, manubrium short, knoblike. Gubernaculum paired, roundish triangle, distal end tapered. There are ten pairs of caudal papillae, three pairs preanal, seven pairs postanal. Tail ventrally arcuate, with sharply pointed conoid. Bursa narrow, elongate between just above spicule and just before conoid.

Female. Body curve ventrally when heat-killed. Anterior region similar to that of male. Lips of vagina conspicuously protuberant. Vagina very muscular, transvers. Reproductive system didelphic. Uterin sac serving as spermatheca, with well developed sphincter muscle. Ovaries reflexed their entire length, oocytes in double or triple rows for approximately two-third ovary length then in a single row. Anus slightly prominent. Rectum one body-diam. long. Tail conoid to an elongate, arcuate terminus.

Type habitat and locality. Wood of fig tree, *Ficus carica* L., Yoshida campus of Kyoto University, Kyoto 606-8501, Japan, Collected by N. Kanzaki, 25, August 1998.

Type specimens. Holotype (male): slide number *Rhabdontolaimus* M-1 (USDA Nematode Collection number: T-552t); Allotype (female): slide number *Rhabdontolaimus* F-1 (USDA Nematode Collection number: T-553t). USDA Nematode Collection, Beltsville, Maryland.

Paratypes: slide number *Rhabdontolaimus* M-2-10 (USDA Nematode Collection number: T-5032p-T-5040p), F-2-10 (USDA Nematode Collection number: T-5041p-T-5049p). USDA Nematode Collection, Beltsville, Maryland. Slide number *Rhabdontolaimus* M-11-18, F-11-18. The Harbarium and Insect Museum of the National Institute of Agro-Environmental Science, Tsukuba, Ibaraki, Japan. Slide number *Rhabdontolaimus* M-19-21, F-19-22. Kyoto University, Environmental Mycoscience Laboratory Collection, Kyoto, Japan.

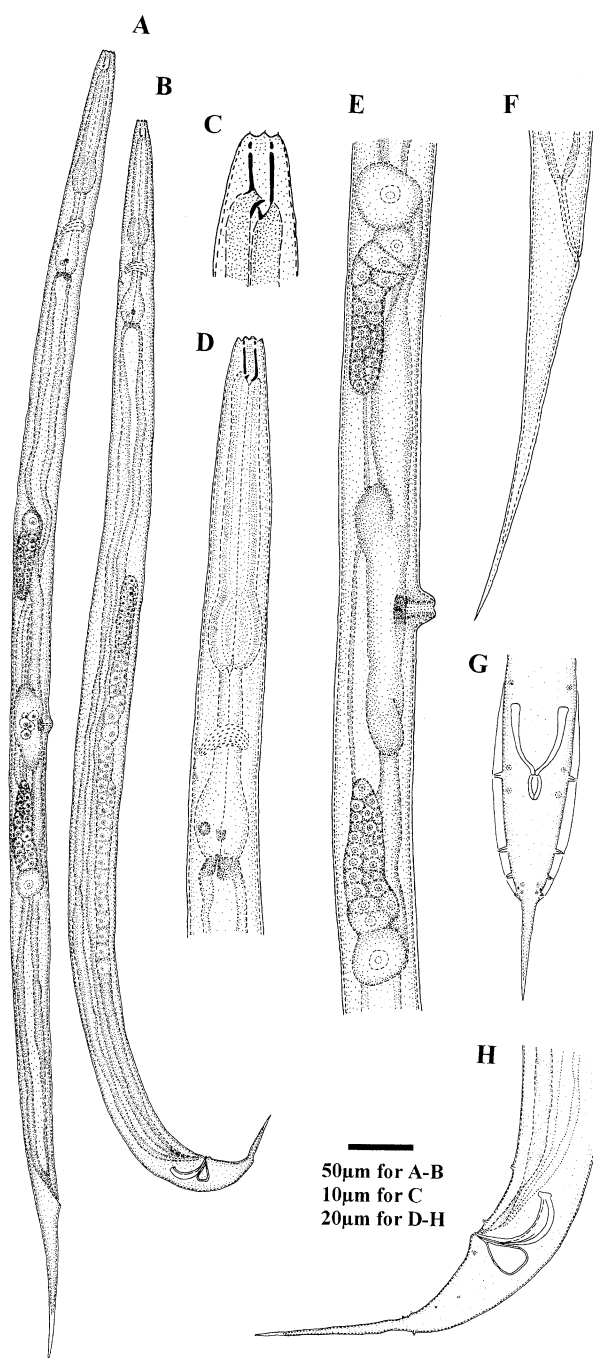


Fig. 1. *Rhabdontolaimus psacotheae* n. sp. A: Female; B: Male; C: Male, lip region; D: Male, anterior portion; E: Female, Reproductive organ; F: Female, Tail; G: Male, ventral view of tail; H: Male, lateral view of tail.

Diagnosis and Relationships. *Rhabdontolaimus psacotheae* n. sp. is characterized by long tail of both sexes, and roundish triangle gubernaculum of male.

Five species are known to this genus (Andrassy, 1984). *R. psacotheae* n. sp. is close to *R. carin-*

thiacus and *R. haslacheri* according to the locations of caudal papillae, *i.e.*, three pairs at preanal and seven pairs at postanal; and similar values of L, a, b and V (Table 2). While, the morphometric values of *R. psacothaeae* n. sp. is completely differ from *R. magnus* (Table 2), though the arrangement of caudal papillae is identical to each other (Andrassy, 1984), and the arrangement of the caudal papillae of *R. psacothaeae* n. sp. is differ from that of *R. adepagus* and *R. frontali*, these two species have totally five (*R. adepagus*) or six (*R. frontali*) pairs of caudal papillae (Massey, 1974).

R. psacothaeae n. sp. is distinguished from *R. carinthiacus* and *R. haslacheri* by the shape of gubernaculum and tail of males and females. The gubernaculum of *R. psacothaeae* n. sp. is broad roundish tri-

Table 1. Measurements of *Rhabdontolaimus psacothaeae* n. sp. (all measurements in μm)

	Males		Females	
	Holotype	Paratypes ¹⁾	Allotype	Paratypes ¹⁾
n	1	20	1	21
L	1018	966 \pm 125 (592-1099)	947	985 \pm 69 (904-1153)
a	25.0	28.7 \pm 4.3 (16.5-34.1)	31.4	31.1 \pm 3.3 (22.6-35.3)
b	5.7	5.4 \pm 0.7 (3.1-6.2)	5.2	5.3 \pm 0.3 (4.9-6.1)
c	10.6	10.8 \pm 1.0 (7.3-11.7)	7.9	7.6 \pm 0.4 (6.8-8.2)
c'	3.2	3.4 \pm 0.2 (3.1-3.8)	6.2	6.6 \pm 0.6 (4.9-7.8)
spicule	31.9	30.8 \pm 1.9 (28.4-35.5)	-	-
gubernaculum	17.7	14.9 \pm 1.5 (10.6-19.5)	-	-
V	-	-	51.3	51.3 \pm 1.2 (49.2-54.4)

¹⁾ Mean \pm SD (range).

Table 2. Morphometric comparisons of *Rhabdontolaimus* species (all measurements in μm).

	<i>R. adepagus</i> ¹⁾		<i>R. carinthiacus</i> ²⁾		<i>R. frontali</i> ¹⁾		<i>R. haslacheri</i> ²⁾		<i>R. magnus</i> ³⁾	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
n	?	?	?	?	?	?	?	?	?	?
L	700-790	770-900	898-1071	1049-1265	800	860	750-825	825-1005	1100-1400	1100-2000
a	29.8	29.3-30.8	23.63-25.50	24.98-25.82	27.5	24.5	26.19-26.78	26.1-26.19	14-18	12-20
b	5.1-6.0	5.5-6.4	5.38-5.79	6.24-6.33	6.25	5.8	5.13-5.2	5.61-6.05	6.2-6.8	5.7-8.7
c	14.0-14.2	10.1-14	14.67-15.22	11.0-11.04	14.47	10.8	12.4-15.3	9.43-9.57	15	7-12
c'	2-2.5	4-5	3.0 ⁵⁾	4.0 ⁵⁾	1.5	5	2.4 ⁵⁾	5.0 ⁵⁾	2-2.5	3-4
spicule	33 ⁴⁾	-	31-37	-	44 ⁴⁾	-	27-30	-	50-60	-
gubernaculum	23 ⁴⁾	-	22-23	-	27 ⁴⁾	-	15-17	-	21-24	-
V	-	51	-	51.8-52.97	-	51	-	50.28-52.29	-	44-55

^{1,2,3)} original data from Massey (1974), Rühm (1956), and Andrassy (1984), respectively.

^{4,5)} calculated from figures in Massey (1974), and Rühm (1956), respectively.

angle, while the gubernaculum of the other two species are narrow, water drop like shape (Rühm, 1956), and tail of *R. psacothaeae* n. sp. is longer than that of the other two species, *i. e.* value *c* of *R. psacothaeae* n. sp. (7.3-11.7 for males, 6.8-8.2 for females) is smaller than those of *R. carinthiacus* (14.67-15.22 for males, 11.0-11.04 for females) and *R. haslacheri* (12.4-15.3 for males, 9.43-9.57 for females), and value *c'* of *R. psacothaeae* n. sp. (3.1-3.8 for males, 4.9-7.8 for females) is larger than those of *R. carinthiacus* (3.0 for males, 4.0 for females) and *R. haslacheri* (2.4 for males, 5.0 for females) (Table 2).

REMARKS

Generally, *Rhabdontolaimus* nematodes are known to have the relationships to Coleopteran insects, *i. e.* *R. carinthiacus* is isolated from reproductive tract of *Acanthocinus aedilis* (Cerambycidae) (Rühm, 1956), frass of *Myelophilus piniperda* (Scolytidae) (Rühm, 1956), and body of *Blastophagus* (= *Tomicus*) *minor* (Scolytidae) (Gurando, 1979); *R. haslacheri* is isolated from the frass of *Scolytus mali* (Scolytidae), *Cerambyx scopolii* and *Leiopus neburossus* (Cerambycidae) (Rühm, 1956); *R. adephagus* and *R. frontalis* are noted to have related to dead pine trees and *Dendroctonus frontalis* (Scolytidae) (Massey, 1974); *R. magnus* is noted to have related to "erdbewohnenden Käfern", ground beetle (Andrassy, 1984). Similar to the other *Rhabdontolaimus* species, *R. psacothaeae* n. sp. was isolated from a species of cerambycid beetle, *P. hilaris*. Furthermore, *P. hilaris* is known to be the vector of *Bursaphelenchus conicaudatus*, a mycetophagous commensal nematode (Kanzaki and Futai, 2001). *R. psacothaeae* n. sp., therefore, shares host trees and vector beetles with *B. conicaudatus*. Though the life history of *R. psacothaeae* n. sp. has been unknown so far, *R. psacothaeae* n. sp. seems to be bacteriophagous species, because the nematode easily propagated on Asparagine-Mannitol agar. Therefore, the comparison of the life history between *R. psacothaeae* n. sp. and *B. conicaudatus*, or between *R. psacothaeae* n. sp. and the other *Rhabdontolaimus* species might be good cases of habitat segregation of nematodes, between bacteriophagous and mycetophagous species sharing host trees and vector beetles, or habitat segregation within the genus *Rhabdontolaimus*, respectively.

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和文摘要

キボシカミキリ *Psacotha hilaris* 虫体、 及びイチジク *Ficus carica* 材より検出された *Rhabdontolaimus psacothae* n. sp.の記載

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キボシカミキリ *Psacotha hilaris* 虫体、及びイチジク *Ficus carica* 材より検出された *Rhabdontolaimus* 属の線虫を *Rhabdontolaimus psacothae* n. sp. として記載した。この種は雄成虫の丸みがかった三角形の副刺と、雌雄成虫の長く伸びた尾端の形状により特徴づけられる。また、その雌雄成虫の形態計測値と、雄成虫の尾乳頭の配列から、この種は、*R. carinthiacus* 及び *R. haslacheri* に近縁であると考えられたが、いくつかの形態計測値と、副刺の形状がこれら2種とは異なっていた。